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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/033,656 | 12/27/2001 | Weimin Li | MICRON.076DVI | 7957 |

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EXAMINER

BROPHY, JAMIE LYNN

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2822

DATE MAILED: 09/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

ART

Office Action Summary

Application No.

10/033,656

Applicant(s)

LI, WEIMIN

Examiner

J. L. Brophy

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 March 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. 6) ☐ Other: _____

DETAILED ACTION

This office action is in response to the amendment filed 7/18/03.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2 and 4-7 are rejected under 35 U.S.C. 102(e) as being anticipated by Marty et al (6,180,520).

Marty et al teach an IC comprising a first metallization level 11 providing a first portion of the electrical path;

A second metallization level 12 providing a second portion of the electrical path, the second metallization level 12 separated from the first metallization level by a gap; and

An interlevel dielectric 41 directly contacting the first and second metallization levels and filling the gap between the first and second metallization levels 11, 12, the interlevel dielectric 41 comprising polysiloxane, consisting essentially of silicon, oxygen, carbon and hydrogen and incorporating carbon therein and having a dielectric constant of less than about 3.2 (col. 3, lines 29-34),

Wherein the metallization levels 11, 12 comprise metal runners.

See Fig. 1 and accompanying text.

Claims 1-7 are rejected under 35 U.S.C. 102(e) as being anticipated by Aoi et al (5,877,080).

Aoi et al teach an IC comprising a first metallization level 24 providing a first portion of the electrical path;

A second metallization level 24 providing a second portion of the electrical path, the second metallization level 24 separated from the first metallization level by a gap; and

An interlevel dielectric 21 directly contacting the first and second metallization levels 24 and filling the gap between the first and second metallization levels 24, the interlevel dielectric 21 comprising polysiloxane, consisting essentially of silicon, oxygen, carbon and hydrogen and incorporating carbon therein and having a dielectric constant of less than about 3.2 (col. 10, lines 30-51),

Wherein the interlevel dielectric has a carbon content of between about 5% and 20% relative to a silicon content (col. 11, lines 13-17), and

Wherein the metallization levels 24 comprise metal runners.

See, for example, Fig. 3(d) and accompanying text and col. 10, line 23 through col. 11, line 27.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marty et al in view of Gardener et al (5,869,379) or Aoi et al in view of Gardener et al.

Marty et al and Aoi et al teach an IC that comprises an interlevel dielectric with a low dielectric constant as applied above to claims 1, 2 and 4-7 and claims 1-7, respectively. However, Marty et al and Aoi et al do not teach that the interlevel dielectric may be used as a sidewall spacer.

Gardener et al teaches a transistor with a sidewall spacer made of a low dielectric constant material (col. 2, lines 13-19) for the purpose of reducing the capacitive coupling between the gate conductor and adjacent source/drain regions.

Since Marty et al, Aoi et al and Gardener et al are from the same field of endeavor, the purpose disclosed by Gardener et al would have been recognized in the pertinent art of Marty et al and Aoi et al.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the method disclosed by Marty et al or Aoi et al by using the low dielectric constant insulating layer as a sidewall spacer in a transistor structure because a person of ordinary skill in the art at the time the invention was made would have been motivated to lower the dielectric constant of the sidewall spacer in order to

Art Unit: 2822

reduce capacitive coupling between the gate conductor and adjacent source/drain regions (see Gardener et al, col. 2, lines 21-25).

Response to Arguments

Applicant's arguments filed 7/18/03 have been fully considered but they are not persuasive.

Applicant mainly argues that the limitation "metallization level" should be interpreted as the metal layers formed on the same horizontal level and that "successive metallization levels" (as in claim 1) and "first and second metallization levels" (as in claim 5) are metal layers that are vertically separated. For example, in the Marty et al reference, applicant refers to reference number 1 as the first metallization level and reference number 2 as the second metallization level. Examiner argues that such an interpretation of these limitations is not in commensurate scope with the remaining claims. Claim 10 states that the first metallization level is a transistor gate and that the second metallization level is a contact to a transistor active area. The transistor gate and the contact are on the same horizontal level. Therefore, applying applicant's suggested narrow interpretation of the "metallization level" limitations would conflict with at least claim 10. Therefore, applicant's arguments are not found persuasive and the limitations of "successive metallization levels" and "first and second metallization levels" do not preclude metal elements which are on the same horizontal level.

If applicant's interpretation of the "metallization level" limitations were acceptable, it is noted that in the Marty et al reference, the second dielectric layer 42 is applied in a

Art Unit: 2822

preferred embodiment (see Marty et al, col. 3, lines 60-64) and that non-preferred embodiments constitute prior art (MPEP 2123). In addition, the Aoi et al reference teaches that an upper metallization layer is formed on the insulating film (see, for example, Aoi et al, claim 1).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to J. L. Brophy whose telephone number is (703) 308-6182. The examiner can normally be reached on M-F (8:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (703) 308-4905. The fax phone numbers

Art Unit: 2822


for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

J.L.B.

jlb

August 28, 2003


AMIR ZARABIAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800